

IN THE SPECIFICATION:

Please amend paragraph [0010] as follows:

[0010] Other processes for forming elongated thermoplastic members include, for example, ~~U.S.~~ U.S. Patent 5,891,379, issued to Bhattacharyya et al., and U.S. Patent 5,182,060, issued to Berecz. Bhattacharyya discloses a process of forming fiber-reinforced plastic material into a desired shape which includes heating the material to a temperature above the melting temperature of the thermoplastic resin or matrix material. The heated material is cooled below the melting temperature but still maintained at a temperature which is above the recrystallization temperature of the thermoplastic material, and then passed through a plurality of roll-forming dies in order to produce a desired shape. The shaped material is then further cooled so that the fiber-reinforced plastic material will retain the shape imposed thereto by roll-forming dies. Berecz discloses a process of continuously forming a thermoplastic composite shape including heating the unidirectional tape or woven cloth, passing the heated material through a set of rollers, and then passing the heated material through a matched metal die which acts as a rapidly reciprocating punch to form the final shape.

Please amend paragraph [0046] as follows:

[0046] A roller 216, configured to complementarily engage one or more of the mandrels 206A-206C, may be removably coupled to the carriage assembly 208 and may be coupled to an actuator 217 such that the roller 216 may be moved in the substantially vertical direction as indicated by directional arrow 218. The roller 216 may also be configured to swivel or rotate about a substantially vertical axis as indicated by directional arrow 219. The rotation of the roller 216 about the substantially vertical axis may be accomplished, for example, by allowing the ~~roller~~ roller 216 to freely swivel such that it generally follows the mandrel (e.g., 206B) with which it is engaged as the carriage assembly 208 moves in direction 211. In another embodiment, an actuator may be used to motivate the roller 216 about the substantially vertical axis as may be desired.

Please amend paragraph [0049] as follows:

[0049] In other embodiments, the mandrels 206A-206C may deviate laterally relative to the longitudinal direction of the base 204 (i.e., in the direction indicated by directional arrow 222). Such complex geometries may be accommodated by the present invention through the various degrees of freedom offered by the arrangement shown. It is noted that, in one embodiment, the roller 216 may be coupled to a wrist 234 which allows the axis upon which the roller 216 rotates to be varied. Thus, the ~~roller~~ roller 216 may be able to remain in substantial contact with a mandrel (e.g., 206B) even if the mandrel exhibits a twist or rotation relative its longitudinal axis, thereby enabling the formation of elongated members 202 exhibiting a similar twist relative to their respective longitudinal axes.

Please amend paragraph [0052] as follows:

[0052] Each device 312A-312D may further include associated actuators or drive mechanisms in order to move the devices 312A-312D relative to the base 304 and to apply pressure via an associated roller to any material laid up on the mandrels 306A-306D. Each device 312-312D may be programmed to form identical stiffeners or different stiffeners depending on the individual configuration of the mandrels ~~306-306D~~ 306A-306D mounted on the base 304.

Please amend paragraph [0053] as follows:

[0053] Referring to FIG. 7, an individual device 312B is shown positioned above its corresponding mandrel 306B without the associated ~~gantry~~ gantry 310 (FIG. 6) for clarity in describing the operation of the device 312B. The device 312B includes an automated material dispenser 320 including a plurality of ply dispensers 322A-322D for dispensing and laying up plies of composite material onto the mandrel 306B. It is noted that the ply dispensers 322A-322D may be configured to dispense plies of composite material, such as prepreg tape or cloth, which vary in width. Using such varied-width plies of material, the elongated member 302B may be configured such that it exhibits a greater thickness (i.e., by inclusion of more plies) in one portion of the elongated 302B member than another. For

example, referring briefly to FIG. 8A in conjunction with FIG. 7, the first ply dispenser 322A may be configured to dispense a ply 330A which extends throughout the entire "width" or extent of the cross-sectional geometry of the elongated member 302B. Another ply dispenser 322C may dispense a ply 330C which only extends across the upper lateral portion 332 (e.g., the cap) of the cross-sectional geometry of the elongated member 302B. Thus, the elongated member 302B may be designed and tailored with respect to ply or material placement in accordance with expected loadings and applied stresses by increasing or reducing the effective number of plies in a given section or portion thereof. Additionally, it is noted that the individual plies of material may be configured to exhibit substantially any desired fiber orientation (or orientations) as may be needed in accordance with expected loadings and stress states of the elongated member 302B. Such is a significant advantage over other forming processes such as pultrusion.

Please amend paragraph [0058] as follows:

[0058] The apparatus 400 includes a plurality of rollers 406 which are each configured to engage a specific portion of the male mandrel 404 (or the material plies laying thereover) in order to form a desired cross-sectional geometry. For example, a first roller 406A may be configured to press the plies of material onto the top surface of the male mandrel 404. One set of rollers 406B may be configured to form the plies of material about the exterior corners of the male mandrel 404. Another set of rollers 406C may be configured to press the plies of material against the sides of the male mandrel 404. A further set of rollers 406D may be configured to press the plies of material into the interior corners of the male mandrel 404, and a final set of rollers 406E may be configured to press the plies of material against the laterally extending portions of the male mandrel 404. Thus, the plurality of rollers 406 work collectively to substantially continuously form an elongated member 402 of a desired cross-sectional geometry over the male mandrel 404.

Please amend paragraph [0061] as follows:

[0061] While the above-described embodiments have largely been discussed using the example of individual prepreg materials being laid up on associated mandrels, it is noted that

nonimpregnated fiber materials may be utilized with such materials being laid on an associated mandrel while substantially simultaneously infusing or impregnating the plies of material with an appropriate resin or binder. For example, referring now to FIGS. 12A and 12B, a mandrel 600 may be formed as a perforated structure having a plurality of apertures 602 or openings defined therein. As plies of material 604 are laid over the mandrel 600, one or more rollers 606 may complementarily engage the ~~mandrel~~ mandrel 600 to form the plies into a desired cross-sectional geometry as described above herein. Additionally, one or more spray nozzles 608 or other deposition devices may infuse resin or binder into the laid up and formed plies to form a shaped, prepreg structure. The resulting elongated member may be partially cured or cured to a B-stage such that the elongated member may be subsequently cocured with an associated composite structure at a later time.